

NASA TECH BRIEF

John F. Kennedy Space Center



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Floating Baffle to Improve Efficiency of Liquid Transfer From Tanks

The problem:

Fuel oils, gasoline, and other liquid chemicals delivered by trucks or railcars are transferred from tanks by either draining, pumping, or pressurizing. Unfortunately many tanks are not emptied completely because of the pull-through effect. The pull-through occurs when much of the liquid has been emptied and a concave vortex develops within the remaining liquid just above the tank outlet. Gas is pulled through the outlet with the liquid. By hearing the gurgling sound of gas pull-through, some personnel consider the tank empty and shut the drain prematurely. The result is that gallons of liquid still remain in the tank to be carried back and forth, causing unnecessary transportation costs and extra man-hours to complete the delivery.

The solution:

A floating baffle guided by the shaft above the tank outlet restricts the pull-through.

How it's done:

The baffle as shown in the figure is attached to the shaft above the tank outlet. It is supported on the liquid surface by two small float tanks. When the liquid tank is full, the baffle is held up against a stop on top of the shaft to prevent the restriction of flow from the outlet. As the tank is being emptied, the baffle, floating on top of the liquid surface, descends with the liquid level toward the outlet until it reaches its bottom stop. The baffle prevents gas pull-through until practically all of the liquid is emptied from the tank.

Note:

Requests for further information may be directed to:
Technology Utilization Officer
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Code AD-PAT
Kennedy Space Center, Florida 32899
Reference: TSP73-10190

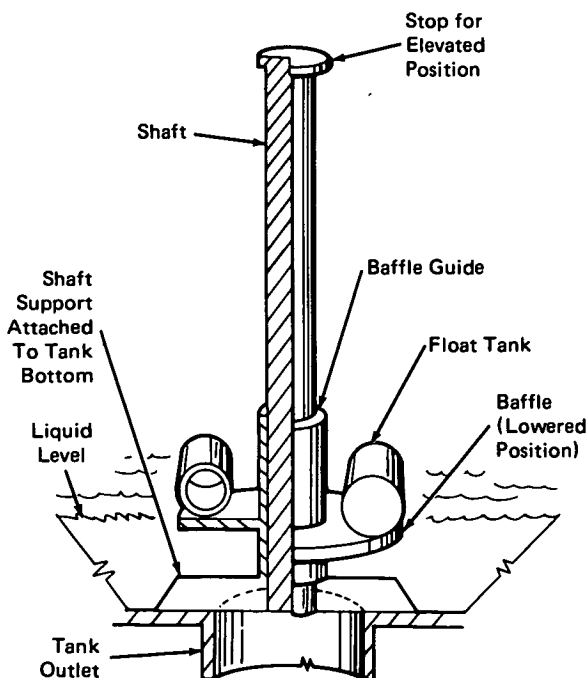
Patent status:

This invention is owned by NASA, and a patent application has been filed. Inquiries concerning non-exclusive or exclusive license for its commercial development should be addressed to:

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Thermal Effects of Spacecraft on Lunar Surface Temperature

J. B. Blevins

The thermal effects of spacecraft on the lunar surface temperature are investigated. The results of a series of experiments are presented. The experiments were conducted in a vacuum chamber at a pressure of 10^{-6} torr. The chamber was heated by a series of electric heaters. The temperature of the chamber was measured by a series of thermocouples. The results of the experiments show that the thermal effects of spacecraft on the lunar surface temperature are significant. The temperature of the lunar surface can be raised by as much as 100°C by the presence of a spacecraft. This is due to the fact that the spacecraft acts as a heat source, radiating energy into the lunar surface. The results of the experiments also show that the thermal effects of spacecraft on the lunar surface temperature are dependent on the distance between the spacecraft and the lunar surface. The temperature of the lunar surface is raised more by a spacecraft that is closer to the surface than by one that is further away. This is due to the fact that the radiation from the spacecraft is more intense at a closer distance.

